

## REMARKS

By virtue of the present amendment, claims 1-20 remain pending in this patent application. Claims 1, 3, 5, 8, 11, 16, and 20 have been amended to address formal issues identified by the Examiner consistent with the Examiner's comments. No claims have been canceled or added by virtue of this amendment. Therefore, it is respectfully submitted no new claim fees are currently due.

In the pending office action, the Examiner indicated claims 5-7, 11, 12, and 16 contain allowable subject matter. The Examiner, however, objected to the claims as being dependent on a rejected base claim. The applicant respectfully thanks the Examiner for the indication of allowable subject matter. Furthermore, the applicant respectfully reserves its right to amend claims 5-7, 11, 12, and 16 into independent format in the future.

In a Non Final Office Action mailed November 6, 2007, the Examiner objected to the drawings for failing to show every feature of the invention specified in the claims. In particular, the Examiner indicated the figures failed to show the "housing" with "two opposite end walls" and the "nominal pressure angle is smaller than 15 degrees." The applicant has provided herewith a replacement figure 1 showing the housing and the two opposite end walls.

Regarding the nominal pressure angle being smaller than 15 degrees, the figures identify gearwheels 30 and 40. Figures 2-5 show the relationship between the gearwheels. One of ordinary skill in the art would understand that the figures as provided disclose the nominal pressure angle of the gearwheels and as such it is respectfully submitted the figures in fact contain and show the required information. However, the figures 2-5 have been amended to specifically show the angles between the normal of the reference circle and the tangent of the gear flank and the reference circle as one of ordinary skill in the art would have understood the drawings to show. As the nominal pressure angle is well understood by one of ordinary skill in the art, and the figures have been updated to reflect the understanding of one of ordinary skill in the art, it is respectfully submitted that no new matter has been introduced by the replacement sheets.

The Examiner also objected to the drawings as failing to include references in the specification. In particular, the Examiner indicated the drawings failed to show

center distance  $A_{AB}$ ,  $A'_{AB}$ ,  $A_{CD}$ , and  $A'_{CD}$ . The applicant has re-drafted the specification to remove references to  $A_{AB}$ ,  $A'_{AB}$ ,  $A_{CD}$ , and  $A'_{CD}$ , which are clearly explained and understood by those of ordinary skill in the art.

Based on the foregoing, it is respectfully submitted that the objections to the drawings are now moot. Withdrawal of the objection is respectfully requested.

The Examiner also objected to the Specification. In particular, the Examiner objected to the Abstract. The applicant has provided a replacement Abstract addressing the concerns of the Examiner. It is respectfully submitted that the objection to the specification is now moot. Withdrawal of the objection to the specification is respectfully requested.

The Examiner rejected claims 1, 3, 5, 8, 16, and 20 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the Examiner indicated the recitation of "the center distance" in claims 1 and 8 lacked sufficient antecedent basis. The recitation of "the normal center distance" in claim 5 lacked sufficient antecedent basis. The applicant has amended claims 1, 5, 8, and 11 correcting the antecedent basis issues identified by the Examiner. It is respectfully submitted that claims 1, 5, 8, and 11 satisfy the requirements of 35 U.S.C. § 112, second paragraph. Withdrawal of the rejection of claims 1, 5, 8, and 11 is respectfully requested.

The Examiner rejected claims 3, 16, and 20 stating that the recitation of "around" in the claim rendered the claim indefinite. The applicant respectfully traverses the rejection. In particular, the Patent Office and courts have long recognized the ability to use relative terms in claim language. In particular, MPEP section 2173.05(b) indicates that the "fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. § 112, second paragraph." (*Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818 (Fed. Cir. 1984). Terms such as, for example, about, essentially, substantially, and the like are in fact common claim recitations when exact precision in a recitation is not necessary. In this case, the claim 3, 16, and 20 are dependent from other claims that set the range of the pressure angle to be between at most 0 to 15 degrees. Thus, the claim recitation of around 10 degrees is clearly bounded by the ranges set forth in the preceding claims. In

this case, the recitation of about 10 would be clearly understood by one of ordinary skill in the art to include the value of 10 degrees at least plus or minus a tolerance on the mechanisms. As such, it is respectfully submitted that claims 3, 16, and 20 are not indefinite as the relative terminology of around 10 degrees does not render the claim recitation indefinite. See MPEP section 2173.05(b). Withdrawal of the pending rejection of claims 3, 16, and 20 is respectfully requested.

In the November 6, 2007, Office Action, claims 1-4, 8-10, 13, 17, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable and obvious in view of United States Patent Number 4,643,654 to Rinder (hereinafter Rinder) in view of Japanese Publication Number 60-085284 to Nozue (hereinafter Nozue). The applicant respectfully traverses the rejection.

As an initial matter, claim 1 recites a combination of elements including, for example, "each of the gearwheels is designed with one and the same nominal pressure angle which is smaller than 15° in order to minimize the deviation of the actual backlash from the nominal backlash when a center distance deviates from the nominal center distance as a consequence of a change in temperature of one of the parts included in the screw compressor," which is not shown, disclosed or taught by Rinder or Nozue either alone or in combination. In fact, Rinder is completely silent regarding the pressure angle of the related gearwheels. Contrary to the Examiner's suggestion, Rinder discloses nominal pressure angles associated with the rotor associated with the compressor. Further, because Rinder concerns the nominal pressure angles associated with the rotors, one of ordinary skill in the art would not even refer to Rinder when designing the gearwheels. As stated in Rinder at column 2, line 62, to column 3, line 17 (emphasis added):

While several of the basic premises found in the design of screw rotors are related to the premises upon which helical gears are designed, the well-known conventional principles of gear design are *not compatible*, without major modification, with the design of helical screw rotors for compressor applications. If directly applied to the design of helical screw rotors, gear design principles would result in entirely unacceptable leakage paths within the compressor, wide gaps between the lobes of one rotor and the cooperating groove of the opposite rotor and compressors with such minimal capacity as to be unsuitable for the intended purpose of gas compression. Specifically, conventional gear design principles would result in screw compressors with large blow holes, open mesh lines, unacceptable negative torque characteristics, power inefficiency and a

number of rotor lobes so large as to preclude the existence of a meaningful volume between rotors in which to accept gas for compression. It must be appreciated that the purpose of helical gears is to transmit power or motion, one gear to the next, while the purpose of helical screw rotors is to compress a gas between the rotors in cooperation with the housing in which the rotors are disposed.

Thus, as is clear from the text of Rinder, one of ordinary skill in the art would not review or consider a patent relating to rotor design when designing a gear as the operational and design characteristics are completely different. Thus, for at least this reason, claim 1 is patentable in view of Rinder and Nozue either alone or in any reasonable combination thereof because neither reference suggests, discloses or teaches "each of the gearwheels is designed with one and the same nominal pressure angle which is smaller than 15°" as recited by claim 1.

Moreover, even if Rinder did disclose the nominal pressure angle of the gearwheel instead of the rotor, which applicant respectfully submits it does not, Rinder in fact teaches away from the present claim 1. In fact, claim 1 recites a combination of elements including "each of the gearwheels is designed with one and the same nominal pressure angle which is smaller than 15°." Rather than disclosing "the same nominal pressure angle which is smaller than 15°" Rinder discloses the converse. In particular, Rinder discloses the converse of claim 1. At column 7, about lines 36 to 52 recites (emphasis added):

As opposed to the standards which are specifically set for pressure angles of the leading and trailing flanks of a gear tooth are commonly established at 14.5° to 20°, the pressure angles of the present invention are not standardized and may be varied, with other rotor parameters, to optimize screw rotor performance in a screw compressor application. Additionally, in the present invention ***the pressure angles of the leading and trailing flanks are preferably different*** which is a further departure from the teachings of conventional involute gear designs wherein the pressure angles of the leading and trailing flanks are identical. Also, ***the pressure angles of the present invention will preferably be in a range between 25° at 45°***, which is a complete departure from the teachings of standard gear design in which pressure angles are significantly smaller."

Thus, Rinder in fact teaches away from claim 1 as claim 1 recites that "each of the gearwheels is designed with one and the same nominal pressure angle" and the pressure angle is "smaller than 15°."

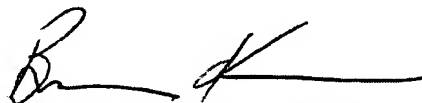
Nozue discloses an oil pump in which a housing is made of aluminum alloy and a pump rotor is made of low carbon steel. Nozue does not appear to disclose any gearwheels for driving the rotor. Consequently Nozue does not cure the defect of Rinder noted above. Moreover, Nozue does not even disclose any material of which such a rotor driving gearwheel could be made of let alone provide any teaching regarding the nominal pressure angle for such gearwheel.

Thus, as neither Rinder nor Nozue disclose, suggest, or otherwise teach anything relating to the nominal pressure angle of the gearwheel, it is respectfully submitted that claim 1 is patentable and nonobvious in view of Rinder and Nozue either alone or in any reasonable combination thereof. Withdrawal of the pending rejection under 35 U.S.C. § 103(a) is respectfully requested.

Claim 8 contains limitations similar to claim 1 outlined above and, at least by virtue of this similarity, is patentable and nonobvious in view of Rinder and Nozue either alone or in any reasonable combination thereof. Withdrawal of the pending rejection under 35 U.S.C. § 103(a) is respectfully requested. Claims 2-7 and 9-20 depend directly or indirectly from either claim 1 or 8 and, at least by virtue of the dependency, are patentable and nonobvious in view of Rinder and Nozue either alone or in any reasonable combination thereof. Withdrawal of the pending rejection under 35 U.S.C. § 103(a) is respectfully requested.

Based on the foregoing, withdrawal of the pending rejection and allowance of claims 1-20 is respectfully requested.

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